**4.2 Exploration NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

*Starting on page 169, read and answer the following*

1. What is a regression line?
2. What is a regression line used for?
3. In example 4.6, what did they predict the pack weight would be for a 150 lb hiker?
4. In example 4.6, what would YOU predict the pack weight would be for a 180 lb. hiker? (just estimate)
5. In example 4.7, what would you predict the gas consumption would be for a temperature of 35 degrees?
6. Why would we trust our gas consumption predictions more than our hiker’s pack weight predictions? (read Example 4.7)
7. When drawing a regression line we want the line to be close the points in what direction? Why?
8. What is the most common method of regression?
9. Define Least-Squares Regression Line (LSRL).
10. What does the LSRL try to minimize?
11. What is the form of the equation for the LSRL? (very bottom of page 171)
12. What is “a”?
13. What is “b”?
14. In Example 4.8 what is the equation for the LSRL?

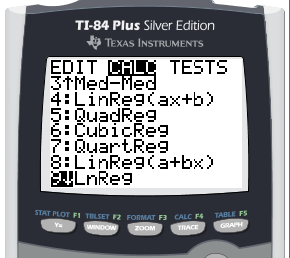
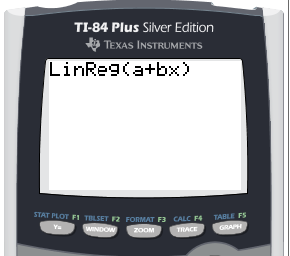
1. What was the slope? What was the interpretation of slope in the context of the problem?
2. What was the y-intercept? What is the interpretation of the y-intercept? Does it have an important meaning?
3. Using the regression line given in example 4.8, predict the pack weight of a hiker who is 180 lbs. Show work below.
4. Go back to your estimate in question #4 above. How close was your estimate to the actual prediction you calculated in the last question?

**Now complete the #27 on page 172:**

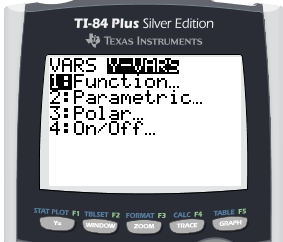
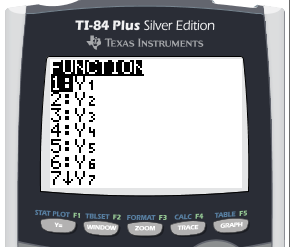
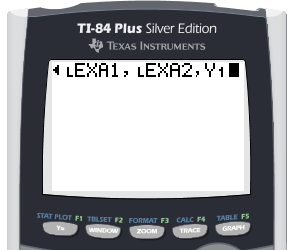
**Making LSR lines on the calculator:**

1. Create a scatterplot of Exam A (from the 4.1 worksheets). EXA1 = X and EXA2 = Y. Sketch it below. (if you deleted the lists, just ungroup HYPOCORR again)
2. We want to find the LSR line for Exam A. To do this:

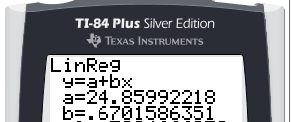
* Exit out of the scatterplot, to you main, clear screen
* Go to STAT, then over to CALC (at the top), then scroll down to #8:LinReg(a+bx) and hit ENTER

* You need to put in 3 things now: X-list, Y-list, Y1. To do this:
  + Find your X-list (2nd, LIST, find EXA1, then hit ENTER)
  + Type a comma, then find your Y-list (EXA2)
  + Type a comma, then press the VARS button (next to the CLEAR button), then go over to YVARS (at the top) and hit ENTER and then ENTER again. Y1 should now be on your screen. See screen shots below for help.

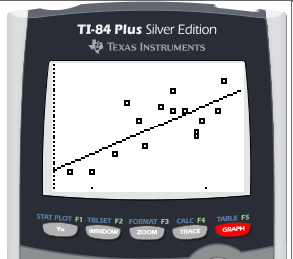
   

* Now hit ENTER and the calculator should give you your LSR line:



* So the LSR line is:

Y = 24.859 + 0.67(X) or EXA2 = 24.859 + 0.67(EXA1)



* Now hit GRAPH. The line should also be on your scatterplot!

Practice:

1. Create a scatterplot of the exams for Class B (EXB1 and EXB2). Sketch it below.
2. Describe the plot (form, direction, strength)
3. Find the correlation for Class B
4. Find the LSR line for Class B using the calculator. Write the equation below:
5. Sketch the LSR line on your scatterplot in part (a). (use the graph on your calculator to help you!)
6. I want to predict the second exam score (y-variable) for someone in class B. They got a 78 on the first exam (x-variable). Using your LSR line, predict their second exam score. Show work below.